by LAWRENCE GROSE, IRVING ROTTENBERG, and ROBERT C. WASSON

New Estimates of Fixed Business Capital in the United States, 1925-65

WITH this report, the Office of Business Economics announces the completion of new measurements of the Nation's stock of fixed business capital. This article describes the method by which the calculations were made and illustrates the types of information that are available to the public.

Like an earlier, less elaborate calculation of the Nation's capital stock,[1] this project was undertaken in connection with an interdepartmental study of economic growth, in which OBE participates along with the Bureau of Labor Statistics, the Council of Economic Advisers, and other Federal agencies.

The study is restricted to the investment by business firms and nonprofit organizations in equipment and nonresidential structures. Calculations were made for gross capital stocks, discards or retirements, depreciation, gross investment, net investment, net capital stocks, ratios of net to gross stocks, and the age composition of gross and net stocks; a glossary at the end of this article defines these measures.

In order to calculate capital stocks for this report, it was necessary to estimate not only gross investment but also the average service lives of assets, distributions of service lives around their averages (retirement patterns), and the rate at which assets depreciate.

The calculations were made on the basis of a large number of alternative assumptions as to the economic service lives, retirement patterns, and depreciation formulas of structures and equipment because, in our present state of knowledge on these subjects, we cannot be sure that any single variant is the correct one. The present study differs from the earlier one mainly in that it uses more up-to-date information on gross investment and employs several assumptions as to the retirement pattern of assets.

Like the earlier study, several bases of valuations are presented for the calculations.

Except for the age composition data, which have been calculated only for selected years, the measures are presented as continuous time series for 1925-65. The gross investment figures are available for a long period of years, back to 1820 for some assets. In addition to totals, industrial detail for the measures is shown for the farm and nonfarm sectors of the economy, with the latter further broken down into manufacturing and nonmanufacturing components. Each of the industrial classifications provides data for structures and equipment both separately and combined. There is also a calculation of the capital stock measures that presents figures for 20 groups of equipment and seven types of structures for all industries combined, on the basis of one assumption regarding service lives.

Although the present study provides a range of estimates of stocks, retirements, and depreciation for particular industries and time periods, the user may well find that other researchers, employing more refined data and techniques, have prepared estimates that are superior to the corresponding series in this study. Any reader concerned with an intensive study of one or more components of the stock in isolation will probably prefer such estimates to the present OBE calculations. On the other hand, the OBE calculations are useful in providing an overall view and in exhibiting the effect of alternative assumptions on the final results.

How the Calculations Were Made

The calculations were prepared by the perpetual inventory method. This method used data on gross investment over a period of many years along with estimates of service lives—the period of years over which an asset is expected to yield productive services—to calculate the gross capital stock. Gross stocks at the start of any year are obtained by cumulating gross investment in prior years and subtracting from this accumulation the gross investment in those assets that have completed their useful lives and have been discarded or retired. Depreciation charges are obtained by applying a depreciation rate to gross investment. Net investment is equal to the gross investment for the period less the amount of depreciation for the period. Net capital stocks for a period are the difference between cumulated gross investment and cumulated depreciation on that gross investment.

---

1. George Jaszi, Robert C. Wasson, and Lawrence Grose, "Expansion of Fixed Business Capital in the United States," SURVEY OF CURRENT BUSINESS, November 1962.

NOTE.—Mr. Wasson was in charge of developing the methodology underlying the calculations described in this article. The programming and machine work were done by CEIR, Inc., Washington, D.C.

The gross investment series that were utilized and the assumptions made concerning the service lives of assets, the pattern of retirements, the rate of depreciation, and the basis of asset valuation are discussed below.

Gross investment

The gross investment series that serve as the basic data in the study are taken from the national income and product accounts for the period 1929–65.[2] In these accounts, data are shown for private fixed nonresidential investment in 20 groups of equipment and 14 types of structures. Estimates were prepared in similar detail for earlier years.[3]

In order to present calculations for the three broad industries shown in the study—farm, manufacturing, and all other industries—it was necessary to obtain total gross investment in each of the three industries and a breakdown of each total into 20 groups of equipment and 14 types of structures. The estimates for farming, in total and asset detail, were based largely on information provided by the Department of Agriculture. Data on gross investment in manufacturing establishments from the Census of Manufactures and the annual Surveys of Manufactures were used as totals for this industry. The asset detail was developed by utilizing the Internal Revenue Service's study on "Life of Depreciable Assets," several studies of specialized industries, expert opinions, and our own judgments. The "all other industry" estimates, in total and detail, were the balances left after farms and manufacturing were subtracted from the total of gross investment and were reviewed carefully for reasonableness.

Service lives

Since there is no consensus as to the average useful economic lifetime of individual fixed assets, five different service life assumptions were used in this study. One variant—termed the basic—used average lifetimes for nonfarm equipment based principally on those published in the Internal Revenue Service's Bulletin F (1942 edition) and service lives for agricultural equipment based upon several Department of Agriculture (Agric) actuarial studies of stocks of assets on hand as compared with estimates of original purchases. In the basic variant for all nonfarm structures the average of Bulletin F lives was used for new nonresidential structures and a shorter life for additions and alterations to existing structures. The basic service life for farm structures was arrived at as a compromise between Bulletin F lives and longer lives used at one time by the Department of Agriculture in connection with the estimation of farm production expenses.

Table 1 shows the five service life assumptions used in the study, with the basic variant just described shown as alternative 1. The notation in this variant for the lives of nonfarm structures (Bulletin F minus a percentage) represents a weighted average life of all new investments in structures that is less than that for new structures alone because of the additions and alterations.

The other alternatives are shorter or longer than the basic variant. Although four other life spans were used for equipment, only two others were used in the case of structures for reasons of economy in terms of both costs and computer capacity. Alternatives 2 and 3 for structures are roughly 20 percent longer than the basic variant; this corresponds to the midpoint of alternatives 2 and 3 for equipment. Alternatives 4 and 5 for structures were selected in a similar fashion.

Several types of evidence suggest that alternative 4 is the one that conforms most closely to the actual service lives of fixed capital assets. For equipment, alternative 5 conforms most closely to the service lives now permitted for tax purposes. New regulations ("Guidelines") permitting service lives shorter than Bulletin F were issued by the Internal Revenue Service in the summer of 1962.[4]

The service life assumptions discussed above are averages and do not necessarily hold from year to year. For example, during wars or other periods of high capacity utilization, existing equipment and structures may be continued in use beyond their normal average lives. Unusual technological advances may also change service lives drastically. There is little information on changes over time in the average service lives of individual assets, and the OBE calculations, with few exceptions, were based on the assumption that the average lives have been constant. However, the average lives for groups of assets in the study—for example, the 20 groups of equipment—change over time because of differences in asset composition.

Retirement of assets

Service lives refer to averages. Underlying the service life of a given asset or group of assets is a distribution of retirements or discards. For ex-

2. This study used gross private fixed nonresidential investment for 1929–64 as shown in the August 1965 SURVEY OF CURRENT BUSINESS and preliminary estimates for 1965 prepared in December 1965. Subsequent revisions of the data for the years after 1962 have not been incorporated into the present study.

3. The principal source materials were: William H. Shaw, *Value of Commodity Output Since 1869*, National Bureau of Economic Research, 1947; "Construction Volume and Costs, 1915–1956," *Statistical Supplement to Construction Review*, U.S. Department of Labor and U.S. Department of Commerce, 1956; Simon Kuznets, *Capital in the American Economy: Its Formation and Financing*, Princeton University Press, 1961, Statistical Supplement, Appendix B; Melville J. Ulmer, *Capital in Transportation, Communications, and Public Utilities*, Princeton University Press, 1960; U.S. Department of Agriculture, *Farm Income Situation*, July 1965; Robert E. Gallman, "Commodity Output, 1839–1899," and Marvin W. Towne and Wayne D. Rasmussen, "Farm Gross Product and Gross Investment in the Nineteenth Century," both in *Trends in the American Economy in the Nineteenth Century*, Volume 24, Studies in Income and Wealth, National Bureau of Economic Research, Princeton University Press, 1960.

4. *Depreciation Guidelines and Rules*, Internal Revenue Service, Publication No. 456, July 1962.

Table 1.—Service Life Assumptions

Alternative	Equipment	Structures		
	All industries	Farm	Manufacturing	Nonmanufacturing
1	Bulletin F and Agriculture	45 years	Bulletin F, −20 percent	Bulletin F, −7 percent.
2	Bulletin F and Agriculture, +25 percent	55 years	Bulletin F, −3 percent	Bulletin F, +13 percent.
3	Bulletin F and Agriculture, +15 percent	55 years	Bulletin F, −3 percent	Bulletin F, +13 percent.
4	Bulletin F and Agriculture, −15 percent	35 years	Bulletin F, −35 percent	Bulletin F, −23 percent.
5	Bulletin F and Agriculture, −25 percent	35 years	Bulletin F, −35 percent	Bulletin F, −23 percent.

ample, a truck has an average service life of 10 years, but some trucks are wrecked after a few months of use and others are used for 15 or 20 years. To show the effect that differences in the timing of asset retirements have on the capital stock measures, the present study employed three variants of retirement patterns. One variant assumes that all similar assets are retired at the same age—namely, when their mean service life has been attained; the other two variants take account of the fact that similar assets are retired at different ages.

In the tabulations, the first variant is called the basic retirement pattern. Of the other two variants, one, called the Winfrey S–3 distribution, assumes that the retirement of similar assets occurs in specified patterns around the mean service life. The pattern chosen for this study was a minor modification of the Winfrey S–3 curve,[5] a bell-shaped distribution, with discards starting at 45 percent of the average service life or mean of this distribution and continuing until 155 percent of the average life has been attained.

The third variant assumes that an equal percentage of retirements occurs in each year, starting when 70 percent of the mean service life is attained and continuing until 130 percent of the mean service life is reached. For example, when the average service life of an asset is 10 years, this method assumes that one-seventh of the assets are retired in the seventh year, and so on, until the last one-seventh are retired 13 years after the initial investment. This is referred to as the flat distribution.

In order to make use of Bulletin F service lives for specific types of equipment (e.g., tables, chairs, desks, etc.) and thus establish more precise retirement patterns than was possible with only 20 groups of equipment, the gross investment for equipment was disaggregated into about 180 types, mainly on the basis of shipments data from the Census of Manufactures. These detailed calculations were used with the basic retirement pattern. Limitations of computer capacity precluded the use of this detailed procedure for the other two retirement methods.

For purposes of judging the effect of the use of the detail as compared with more aggregated data, a variation of the basic retirement method was calculated for equipment: It was assumed that every asset in each of the 20 broad equipment groups was retired at the mean service life for the group as a whole. Calculations based on this retirement variant, however, were made only for the Bulletin F less 15 percent service life, and these are designated Wt. AV. in the tabulations.

Three assumptions as to depreciation[6]—the "using up" of the productive services of assets—have been employed in this study, since there is no consensus as to the best formula. One calculation employs the "straight-line" method, which assumes that the services are used up in equal installments over the life of the asset. Two other calculations were made; both assume that an asset yields larger services in the initial years of its operation and a declining amount over the remaining years of its service life. One of these variants employs the "double-declining balance" method, in which twice the straight-line rate of depreciation is charged in the first year and is applied to the remaining value of the asset in succeeding years. The other variant employs "the sum of the years' digits" method. In the first year of an asset's life, depreciation is given by a ratio of the life of the asset over the sum of the years as a denominator; in the second year, the ratio is given by the remaining life of the asset

5. Robley Winfrey, *Statistical Analysis of Industrial Property Retirement*, Iowa Engineering Experiment Station Bulletin 125, December 11, 1935, p. 104.

6. As used in this study, the term "depreciation" includes allowances for both depreciation and accidental damage, which comprise the total of capital consumption in the GNP accounts.

Table 2.—Types of Tables, Features, and Levels of Aggregation, 1966 Capital Stock Study

Types of tables	Service lives [1]	Retirement patterns [2]	Depreciation methods	Bases of valuation	Industries	Type of investment goods	
						Major	Detailed [3]
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1. Gross capital stocks 2. Discards 3. Depreciation 4. Net investment 5. Net capital stocks 6. Ratio of net to gross stocks 7. Age composition of gross stocks 8. Age composition of net stocks	1. Bull. F and Agric. 2. Bull. F and Agric., +25 pct. 3. Bull. F and Agric., +15 pct. 4. Bull. F and Agric., −15 pct. 5. Bull. F and Agric., −25 pct.	1. Basic 2. Winfrey S-3 distribution 3. Flat distribution	1. Straight line 2. Double declining balance 3. Sum of the years' digits	1. Historical (original) cost 2. Constant 1958 cost (alternate 1) 3. Constant 1958 cost (alternate 2) 4. Current year cost (alternate 1) 5. Current year cost (alternate 2)	1. All industries a. Farm b. Nonfarm (1) Mfg. (2) Nonmfg.	1. All types a. Structures b. Equipment	1. 7 types of structures 2. 20 types of equipment

NOTE.—All tables show data for 1925–65, except that the age composition of the gross and net stock is shown only for 11 years (1925, 1930, 1935, 1940, 1945, 1950, 1955, 1956, 1960, 1963, and 1965).

1. The 5 service lives shown were used for equipment. Only three service lives were used for structures. See p. 35 for further explanation.

2. The basic retirement pattern was calculated from capital expenditures data for 9 types of structures and approximately 180 types of equipment. The Winfrey S–3 and flat distribution were compiled from data for 15 types of structures and 20 groups of equipment assets. One additional set of calculations for the basic pattern was made from the 20 groups of equipment assets for one of the alternative service lives (Bull. F—15 percent) and by variants 1 through 6 of column (c) and all variants of columns (d), (e), (f), and (g).

3. Tabulations of these detailed assets were made only for the all industry total for service life alternative 4 column (b). With this exception, the tabulations are restricted to the 3 totals of investments goods shown under column (g). The 7 types of structures are: (1) Industrial; (2) Commercial and miscellaneous; (3) Institutional, excluding social and recreational; (4) Social and recreational; (5) Railroads, local transit, and pipelines; (6) Telegraph and telephone; (7) Other public utilities.

The 20 types of equipment are: (1) Furniture and fixtures; (2) Fabricated metal products; (3) Engines and turbines; (4) Tractors; (5) Agricultural machinery; (6) Construction machinery; (7) Mining and oilfield machinery; (8) Metalworking machinery; (9) Special-industry machinery, n.e.c.; (10) General industrial, including materials handling, equipment; (11) Office, computing, and accounting machinery; (12) Service-industry machines; (13) Electrical machinery; (14) Trucks, buses, and truck trailers; (15) Passenger cars; (16) Aircraft; (17) Ships and boats; (18) Railroad equipment; (19) Instruments; (20) Miscellaneous equipment.

over the same denominator, etc. For an asset having a 5-year life, the sum of the years' digits is 15 (1+2+3+4+5); in the first year, five-fifteenths of the cost of the asset would be charged as depreciation; in the second year, four-fifteenths, and in the fifth and last year, one-fifteenth.

For each asset, or group of assets, depreciation was computed on the basis of gross investment and the distribution of discards provided by the several retirement patterns. For example, if the Winfrey S-3 pattern indicated that 10 percent of the assets of a group with a 5-year average life were discarded when they were 7 years old, depreciation for this 10 percent was calculated on the basis of a 7-year life.

Valuation of capital measures

All of the measures presented in this study were computed in terms of three bases of valuation, each of which may be relevant for different purposes. One valuation is in terms of historical costs. The measures are presented in the prices of the period in which the actual gross investments were made and are thus a mixture of the prices of many years. This valuation is typically used by business in its fixed asset accounting.

A second valuation, which is in constant 1958 dollars, attempts to measure the "real" volume of investment by correcting the historical cost investment series for price changes relative to the base year 1958. This procedure makes use of the implicit price deflators for investment in producers' durable equipment and structures in the U.S. national income and product accounts. This series is designated constant cost 1. Because of deficiencies in some of the structure price indexes,[7] the price series for structures was replaced by an alternative series believed to be less deficient in this respect; the new series for structures was combined with the price series for equipment used previously and the combination was designated constant cost 2. Thus, two variants of constant 1958 dollar estimates were calculated in this study.

The third valuation is in terms of current dollars, i.e., the prices prevailing in the year under consideration. This is accomplished by revaluing the constant 1958 dollar series. Because there are two constant dollar series, there are two corresponding current dollar calculations in this study.

Meaning of real estimates

The derivation of real capital stocks, or capital stocks measured in constant dollars, involves the use of price indexes. In concept, price indexes for capital goods—and indeed, for any type of goods—are designed to measure changes over time in the price of goods of fixed specifications. The fact is, however, that capital goods are changing over time. Each year brings to the market new models of machinery, typically superior in their performance and frequently costlier to produce—in terms of the quantity of labor and materials, for example—than the older models that are being replaced.

In the linking procedure that attempts to achieve comparability between the prices of old and new capital goods, the price indexes exclude any additions to price that are a reflection of the increased cost of production (in real terms) of the new capital goods. Since past experience has demonstrated that the improvement in the performance of capital goods over time has ordinarily exceeded their increased cost of production in real terms, the real measures of capital stock in this study show less growth than they would have shown had the price indexes been adjusted downward to reflect the superior performance of new capital goods.

Table 3.—Sample Format of Gross Stock Tables

(Millions of dollars)

WINFREY S-3 SERVICE LIFE DISTRIBUTION
GROSS STOCKS
MANUFACTURING
HISTORICAL COST
EQUIPMENT

Year	Service life assumption					
	Basic	Percent of basic				Wt. Av.
		125	115	85	75	
1925	10,165	11,804	10,888	9,319	8,675	10,323
1926	10,789	12,115	11,864	9,867	9,190	10,940
1927	11,297	12,720	12,117	10,301	9,561	11,455
1928	11,840	13,855	12,712	10,792	9,950	12,049
1929	12,495	14,115	13,433	11,483	10,444	12,781
1930	12,779	14,811	13,903	11,523	10,542	13,162
1931	12,731	14,895	13,856	11,360	10,302	13,191
1932	12,380	14,401	13,611	10,887	9,821	12,891
1933	12,021	14,173	13,319	10,439	9,317	12,813
1934	11,771	14,083	13,187	10,085	8,906	12,119
1935	11,668	14,109	13,105	9,896	8,668	11,932
1936	11,772	14,337	13,291	9,920	8,843	12,000
1937	12,039	14,774	13,657	10,100	8,802	12,128
1938	11,942	14,831	13,698	9,962	8,684	12,087
1939	11,966	14,968	13,806	9,975	8,701	12,091
1940	12,385	15,504	14,290	10,302	9,093	12,447
1941	13,092	16,290	14,995	11,100	9,838	13,223
1942	13,443	16,721	14,362	11,459	10,234	13,525
1943	13,787	17,060	15,656	11,772	10,666	13,864
1944	14,846	17,871	16,206	12,405	11,290	14,175
1945	15,709	19,002	17,825	13,809	13,692	15,448
1946	17,968	21,191	19,785	16,025	14,935	17,839
1947	21,401	24,879	23,282	19,651	18,420	20,978
1948	25,041	28,869	26,963	23,200	21,962	24,818
1949	27,852	31,229	29,784	25,936	24,668	27,769
1950	30,732	34,196	32,701	28,734	27,330	30,864
1951	34,939	38,805	36,968	32,803	31,182	35,267
1952	39,104	42,843	41,178	36,749	34,816	39,534
1953	43,232	47,218	45,477	40,396	38,439	43,787
1954	47,511	51,799	49,902	44,465	41,996	48,226
1955	51,609	56,300	54,358	48,068	45,258	52,383
1956	57,410	62,089	60,448	53,395	50,101	59,068
1957	63,508	69,302	66,867	58,961	55,357	65,307
1958	67,402	73,912	71,135	62,238	59,156	68,972
1959	70,894	78,254	75,276	65,180	60,063	72,743
1960	75,236	83,338	80,130	68,798	62,867	77,411
1961	78,910	87,898	84,429	71,737	65,494	81,368
1962	83,008	92,980	89,046	75,115	69,318	85,400
1963	87,465	98,406	94,143	78,905	72,414	89,842
1964	93,525	105,869	100,860	84,046	77,198	95,444
1965	100,787	114,359	108,836	90,449	83,148	102,409

Source: U.S. Department of Commerce, Office of Business Economics.

7. See Jaszi, et al., op. cit., pp. 11.

A corollary of the treatment of prices as used in the present study is that the changes in the resultant real stocks are not satisfactory measures of the changes in their productive capacity. They are, however, useful for measuring changes in the productivity of capital (output per unit of capital input) since such changes are reflected in the measure of output rather than in the measure of input.

The Tables Available

The summary information shown in table 2 indicates the kinds of tables that are available in the study. Column (a) lists the subjects for which tabulations were made. Columns (b) through (e) list all the alternatives used for each of the features (service lives, retirement patterns, depreciation methods, and bases of valuation). Column (f) shows the industry detail and column (g) the breakdown by major type of investment good. In all, there are 8 table types, 225 combinations of features, and 15 combinations of industrial detail by type of major investment good. For each of the 8 subjects, tabulations were made, where appropriate, for the 225 combinations of features and 15 combinations of industrial detail by major type of investment good. The gross investment figures, which were the basic inputs for the study, are not shown in table 2 but are available in terms of valuations 1, 2, and 3 of column (e).

A special set of tabulations was also prepared for 7 types of nonfarm structures and 20 types of equipment (column (h)). These 27 items are tabulated only for alternative 4 of the service lives (column (b)) but for all subjects of column (a) and all variants of columns (c), (d), and (e). In all, about 12,000 sheets of printed computer output containing about 86,000 columns of data resulted from the project.

Table 4.—Sample of Net Stock Tables

(Millions of dollars)

WINFREY S-3 SERVICE LIFE DISTRIBUTION
NET STOCKS, USING STRAIGHT-LINE DEPRECIATION
MANUFACTURING
HISTORICAL COST
EQUIPMENT

Year	Service life assumption					
	Basic	Percent of basic				Wt. Av.
		125	115	85	75	
1925	5,909	4,987	6,641	4,292	4,321	6,953
1926	6,282	7,354	6,907	5,557	5,063	6,394
1927	6,486	7,629	7,162	5,731	5,184	6,593
1928	6,722	7,940	7,436	5,913	5,348	6,836
1929	7,069	8,358	7,824	6,210	5,616	7,185
1930	7,045	8,412	7,848	6,146	5,527	7,157
1931	6,732	8,184	7,594	5,814	5,186	6,854
1932	6,233	7,715	7,165	5,271	4,638	6,316
1933	5,781	7,278	6,854	4,786	4,155	5,818
1934	5,450	6,994	6,357	4,473	3,869	5,486
1935	5,317	6,890	6,283	4,345	3,782	5,386
1936	5,419	6,998	6,341	4,457	3,557	5,418
1937	5,715	7,307	6,642	4,765	4,179	5,700
1938	5,676	7,275	6,602	4,740	4,168	5,648
1939	5,774	7,371	6,695	4,851	4,282	5,724
1940	6,225	7,821	7,143	5,312	4,757	6,179
1941	6,930	8,584	7,845	6,017	5,464	6,880
1942	7,231	8,861	8,156	6,306	5,740	7,177
1943	7,463	9,116	8,415	6,546	5,973	7,431
1944	8,012	9,639	8,957	7,064	6,406	7,978
1945	9,185	10,806	10,155	8,192	7,572	9,172
1946	11,024	12,770	12,096	9,967	9,287	11,060
1947	13,898	15,778	14,964	12,734	11,949	13,962
1948	16,640	18,717	17,836	15,318	14,391	16,796
1949	18,298	20,632	19,634	16,778	16,665	18,528
1950	19,875	22,483	21,376	18,132	16,847	20,181
1951	22,571	25,507	24,267	20,673	19,090	22,960
1952	25,029	28,335	26,947	22,743	21,066	25,477
1953	27,346	31,064	29,510	24,753	22,879	27,804
1954	29,454	33,362	32,088	26,745	24,660	30,345
1955	31,727	36,339	34,430	28,457	26,187	32,303
1956	35,381	40,500	38,381	31,800	29,276	36,042
1957	39,128	44,795	42,409	35,174	32,411	39,906
1958	40,561	46,904	44,283	36,224	33,236	41,269
1959	41,754	48,572	45,777	37,040	33,618	42,460
1960	43,668	51,613	47,978	38,524	35,068	44,340
1961	44,918	52,920	48,629	39,409	35,777	45,648
1962	45,840	55,243	51,694	40,688	36,980	47,348
1963	48,755	57,963	54,155	42,506	38,489	49,432
1964	52,340	62,190	58,116	45,840	41,518	53,026
1965	57,065	67,441	63,193	50,147	45,052	57,780

Source: U.S. Department of Commerce, Office of Business Economics.

Stock figures in the tables are as of the end of the year, while the flows are the yearly totals.

Sample tables

As a means of further describing the output of tables in the capital stock study, sample formats for four types of tables are shown: a gross stock table, a net stock table, an age distribution table, and a table for gross stocks of detailed types of equipment.

Table 3, the sample gross stock table, shows the value of manufacturing equipment in historical cost for 1925–65 when a Winfrey S–3 retirement pattern is assumed. The first five columns present the results of the calculations for the five alternative service lives shown in table 2, and the last column gives the results of the calculations that were made using the variation of the basic retirement pattern (Wt. AV.) discussed earlier. The column headings in this table are used for all equipment tables except those pertaining to age composition and detailed types of equipment. Column 1 (Bull. F and Agric) is designated "basic." The service lives in the next four columns are expressed as a percentage of the "basic."

Table 4 presents the value of net stocks of manufacturing equipment, using straight-line depreciation and the same retirement pattern and valuation basis as for the sample gross stock table.

The sample format for tables showing the value of gross stocks of each of the 20 equipment groups is presented in table 5. This table shows the calculations based on the Winfrey S–3 retirement pattern and in historical cost. Calculations for the detailed equipment groups and types of structures were made only for the service life Bulletin F minus 15 percent. Each column of this table represents one group of equipment. To aid the reader, a column key has been added to this table. However, this key does not appear in the printouts; instead, users will be provided with a coding plan that identifies the column headings.

The final table shown here, table 6, presents the sample format of the study's age composition tables and

specifically shows the age composition and the average age of gross stocks of manufacturing equipment in constant (1958) cost, based on the Winfrey S-3 retirement pattern for the basic (Bulletin F) service life for the selected years chosen for the printout.

How To Obtain the Study

All or part of the tabulations from this study will soon be available to the public at their cost of reproduction. The data will be furnished either in the form of copies of the printouts or as microfilms. Interested persons should write to the Office of Business Economics, U.S. Department of Commerce, Washington, D.C. 20230, requesting the table of contents of the 1966 Capital Stock Study, which they may use for their order; alternatively, table 2 of this article may be used for specifying the desired tables. Users will be notified by OBE of the cost of their requests.

Those who wish to obtain computer tapes of this study for their own processing and analysis should address inquiries to the Office of Business Economics. On the basis of the number of these requests OBE will furnish cost estimates.

GLOSSARY

Gross investment is the value of investment each year by businesses and nonprofit institutions in the United States in new producers' durable equipment and nonresidential structures and their net purchases (purchases less sales) of used equipment and structures from government, persons, business, and abroad; it includes margins and commissions to dealers on used transactions. Gross investment is synonymous with gross capital formation.

Gross stocks are the value of the equipment and structures that are available to the economy before account is taken of their loss in value through use, obsolescence, or accident.

Discards are the value of assets that are retired from the stock of capital because of physical deterioration, obsolescence, or accident.

Depreciation is the value lost each year by the stock of capital in use through physical deterioration, obsolescence, or accident.

Net investment is gross investment less depreciation; it represents the value of net additions to the stock of capital each year. It is synonymous with net capital formation.

Net stocks are the depreciated value of past acquisitions of assets that remain in the gross stock. They represent the value of productive services remaining in the gross stock after the value of previous services, as represented by depreciation charges, have been deducted.

The ratio of net to gross stocks provides information on the relative extent to which services embodied in the original goods remain intact. The ratio measures the physical condition of the stock of capital: whether it is more or less up to date. In the case of straight-line depreciation, a special meaning attaches to the 50-percent ratio. This is the figure that would be reached in a stationary economy where new investment was just equal to the value of capital used up. With accelerated methods of depreciation, the corresponding ratio would be lower, but the precise figure would depend upon both the exact method of depreciation used and the average service life of the assets.

Age composition of gross stock in a given year shows the percentage of the gross stock that is attributable to the investment of that and each prior year. The tables showing age composition of gross stock also show the average age of the gross stock in a given year.

Age composition of net stock in a given year shows the percentage of the net stock that is attributable to the investment of that and each prior year. The tables showing age composition of net stock also show the average age of the net stock in a given year.

The data on average age of the net and gross stock are useful measures for indicating the condition of the stock

Table 5.—Sample Format of Gross Stock Tables, by Detailed Type of Investment Goods

(Billions of dollars)

WINFREY S-3 SERVICE LIFE DISTRIBUTION
GROSS STOCKS
TOTAL FARM AND NONFARM
HISTORICAL COST
EQUIPMENT
SERVICE LIFE (85.0 PCT OF BASIC)

Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1925	2,985	1,331	718	1,015	422	727	1,413
1926	2,326	1,421	730	1,096	480	777	1,624
1927	2,574	1,495	732	1,213	487	804	1,619
1928	2,800	1,565	741	1,316	616	838	1,738
1929	3,079	1,647	765	1,447	655	898	1,918
1930	3,264	1,705	759	1,569	673	892	1,960
1931	3,335	1,726	740	1,603	653	833	1,971
1932	3,307	1,711	705	1,561	491	769	1,896
1933	3,249	1,680	668	1,496	426	700	1,824
1934	3,211	1,662	658	1,451	366	641	1,774
1935	3,162	1,676	617	1,478	322	612	1,784
1936	3,122	1,660	618	1,594	303	627	1,854
1937	3,113	1,668	628	1,735	306	682	1,961
1938	3,045	1,622	633	1,854	305	635	2,004
1939	2,987	1,591	631	1,958	318	647	2,084
1940	2,970	1,567	647	2,084	364	704	2,417
1941	3,030	1,572	691	2,309	420	860	2,948
1942	3,008	1,569	645	2,369	457	916	3,437
1943	2,942	1,584	632	2,307	476	958	3,839
1944	2,901	1,630	704	2,442	459	1,038	4,245
1945	2,850	1,719	862	2,698	571	1,241	4,712
1946	3,281	1,927	690	2,469	1,020	1,365	5,271
1947	3,732	2,349	902	2,937	1,453	1,530	6,064
1948	4,165	2,774	1,178	3,360	2,045	1,736	6,600
1949	4,568	3,100	1,365	3,839	2,413	1,897	6,982
1950	5,021	3,478	1,600	4,465	2,806	2,109	7,407
1951	5,699	4,042	1,798	5,077	3,285	2,407	8,226
1952	6,323	4,707	2,074	5,646	3,784	2,684	9,103
1953	6,931	5,433	2,349	6,185	4,172	2,890	10,244
1954	7,600	6,209	2,764	6,518	4,301	3,062	11,472
1955	8,485	6,908	3,136	7,005	4,517	3,322	12,415
1956	9,359	7,720	3,624	7,407	4,785	3,626	13,856
1957	10,258	8,675	4,094	7,646	4,949	3,929	15,275
1958	11,150	9,510	4,661	7,916	5,170	3,896	16,007
1959	12,092	10,204	5,196	8,264	5,554	4,110	16,763
1960	13,010	10,895	5,703	8,158	5,813	4,192	17,737
1961	13,965	11,472	6,217	8,080	5,967	4,215	18,436
1962	14,784	11,968	6,493	8,029	6,268	4,215	19,254
1963	15,881	12,474	6,855	8,144	6,525	4,238	20,204
1964	16,812	13,228	7,229	8,371	7,174	4,340	21,144
1965	18,051	13,971	7,649	8,729	7,985	4,547	22,192

NOTE.—Column key: (1) furniture; (2) fabricated metal products; (3) engines and turbines; (4) tractors; (5) construction machinery; (6) mining and oil field machinery; (7) metalworking machinery.

Source: U.S. Department of Commerce, Office of Business Economics.

but, like the net-to-gross ratios, should be used with caution.[8]

The ratio of current year cost of depreciation to historical cost, although not shown in the study, may be computed from the information provided. It indicates the relative amount by which accounting procedures for tax purposes fail to allow for the replacement cost of new assets. A ratio above 1 indicates that conventional depreciation falls short of replacement cost depreciation; a ratio of less than 1 indicates that it exceeds replacement cost. In the national income accounts, all costs, except profits and nonfarm depreciation, reflect current prices. Adjustments that are sometimes made to profits and depreciation to place them on a par with the other income charges with respect to current pricing make use of this ratio.[9]

The ratio of current year cost of discards to historical cost may be computed and used in a similar fashion with respect to retired assets.

8. For a discussion of some of the problems involved in using these measures, see Jaszi, *et al. op cit.*, pps. 17–18.

9. See Murray Brown, "Depreciation and Corporate Profits," SURVEY OF CURRENT BUSINESS, October 1963.

Table 6.—Sample Table Format of Age Composition of Gross Stocks

(Percent; weighted average in years)

WINFREY S-1 SERVICE LIFE DISTRIBUTION
AGE COMPOSITION OF GROSS STOCKS
MANUFACTURING
CONSTANT COST 1
EQUIPMENT
SERVICE LIFE BASIC
SELECTED YEARS

Input years	1925		1930		1935		1940		1945		1950		1955		1958		1960		1963		1965	
	SIM	CUM	SIM	CUM	SIM	CUM	SIM	CUM	SIM	CUM	SIM	CUM	SIM	CUM	SIM	CUM	SIM	CUM	SIM	CUM	SIM	CUM
1936	0	0	0	0	0	0	7.9	70.3	5.8	24.7	2.0	8.0	0.5	1.3	0.1	0.4	0.1	0.2	0.0	0.1	0.0	0.0
1937	0	0	0	0	0	0	8.1	78.4	6.7	31.4	2.9	10.9	0.7	2.1	0.3	0.6	0.1	0.3	0.0	0.1	0.0	0.1
1938	0	0	0	0	0	0	5.8	84.1	4.8	36.2	2.2	13.0	0.7	2.7	0.2	0.9	0.1	0.4	0.0	0.1	0.0	0.1
1939	0	0	0	0	0	0	6.9	91.0	5.7	41.9	2.8	15.8	1.0	3.7	0.5	1.3	0.2	0.6	0.1	0.2	0.0	0.1
1940	0	0	0	0	0	0	9.0	100.0	7.5	49.6	4.0	19.9	1.6	5.3	0.8	2.1	0.4	1.0	0.1	0.3	0.1	0.1
1941	0	0	0	0	0	0	0	0	8.7	58.2	4.8	24.8	2.3	7.5	1.2	3.3	0.7	1.7	0.2	0.5	0.1	0.3
1942	0	0	0	0	0	0	0	0	4.5	74.7	3.8	28.4	2.0	9.5	1.1	4.4	0.7	2.4	0.3	0.8	0.1	0.4
1943	0	0	0	0	0	0	0	0	4.2	90.9	3.8	32.2	2.1	11.6	1.2	5.6	0.8	3.3	0.3	1.2	0.1	0.5
1944	0	0	0	0	0	0	0	0	7.8	98.7	4.7	36.9	2.7	14.4	1.7	7.2	1.1	4.4	0.5	1.7	0.2	0.8
1945	0	0	0	0	0	0	0	0	11.3	100.0	7.0	43.9	4.0	18.4	2.6	9.9	1.8	6.2	0.9	2.5	0.4	1.2
1946	0	0	0	0	0	0	0	0	0	0	9.8	53.7	5.8	24.2	4.0	13.9	2.5	9.0	1.6	4.1	0.8	2.0
1947	0	0	0	0	0	0	0	0	0	0	13.2	66.9	8.2	32.6	5.8	19.7	4.0	13.6	2.6	6.7	1.5	3.5
1948	0	0	0	0	0	0	0	0	0	0	12.8	79.6	8.2	40.9	5.8	25.5	4.7	18.3	2.8	9.5	1.8	5.3
1949	0	0	0	0	0	0	0	0	0	0	10.1	89.7	6.5	47.4	4.8	30.3	3.9	22.2	2.5	12.0	1.6	6.9
1950	0	0	0	0	0	0	0	0	0	0	10.3	100.0	6.8	54.2	5.1	35.5	4.3	26.5	3.0	15.0	2.0	8.9
1951	0	0	0	0	0	0	0	0	0	0	0	0	6.7	60.9	7.0	42.4	5.9	32.3	4.2	19.3	2.9	11.8
1952	0	0	0	0	0	0	0	0	0	0	0	0	8.0	71.9	7.3	49.7	6.3	38.7	4.8	24.0	3.5	15.4
1953	0	0	0	0	0	0	0	0	0	0	0	0	9.2	81.1	7.6	57.3	6.6	45.5	5.3	29.3	4.2	19.6
1954	0	0	0	0	0	0	0	0	0	0	0	0	9.6	90.7	7.0	65.2	7.3	52.8	6.0	35.3	4.7	24.3
1955	0	0	0	0	0	0	0	0	0	0	0	0	9.3	100.0	7.8	73.0	7.3	60.0	5.9	41.2	4.7	29.0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.8	82.8	9.1	69.1	7.9	49.2	6.4	34.4
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.8	92.6	9.2	78.3	9.2	57.3	6.8	42.2
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.4	100.0	7.0	85.3	6.3	63.6	5.4	47.6
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.9	92.2	6.2	69.8	5.4	53.0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.8	100.0	7.1	76.9	6.4	59.4
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.0	83.9	6.2	65.6
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.7	91.6	6.9	72.5
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.4	100.0	7.6	80.1
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.3	88.4
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.6	100.0
WT. AV.	8.09		8.26		8.61		8.96		7.88		8.07		8.37		6.75		7.15		7.47		7.26	

NOTE.—The complete table in the study is shown in two or more pages of printouts; only the page showing the stocks remaining from gross investment for all years starting with 1936 is reproduced above.

Source: U.S. Department of Commerce, Office of Business Economics.

U.S. GOVERNMENT PRINTING OFFICE : 1966—O-236-052